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BOOK REVIEWS

Satyendra Nath Bose 70th Birthday Commemoration Part I and Part II.

Published by Prof. S. N. Bose 70th Birthday Celebration Committee, 92, Acharya Prafulla Chandra Road, Calcutta-9. Prices Part I-Rs. 10/- (India) $ 3.00 or £ 1 (abroad), Part II Rs. 25/- (India) $ 7.50 or £ 2-10sh (abroad)

It is in the fitness of things that the 70th Birthday of one of the greatest personalities and a top scientist not only of India but of the world was celebrated and the publication of two substantial volumes to commemorate this were undertaken. The latter task undertaken by the organisers has been a stupendous and delicate one on account of the manysided activities of Professor S. N. Bose and the eagerness of the very large number of his admirers to contribute papers to the volumes. It is highly gratifying that the long expected commemoration volumes have at last come out.

In Part I, the first two articles are the life sketches of Professor Bose. The first article depicts him as a scientist and the second his great personality. The former, though brief, touches upon in a very lucid way his principal scientific activities and brings out the great importance of Bose Statistics, in particular. One aspect of his scientific activities has unfortunately been left out, namely, the great impetus he gave to the construction of sophisticated apparatus for scientific reasearch in our own laboratories. In the other sketch the emotional aspects of his life have been described. The great effect upon him of the renaissance in India including the political and educational fields as well as his own important contributions to the renaissance have been described. Although, it gives an insight into his great talents, one seriously misses one of the outstanding aspects of his character which makes him so near and dear to all who have the good fortune of knowing him, namely, his great love and sympathy for not only those near and around him but for his countrymen and humanity in general. His unstinting help to students and political workers in difficulties, whether financial or otherwise, has been proverbial. By plunging himself whole-heartedly into relief works particularly in the riot devastated areas of Dacca district he became a source of inspiration to social service workers. Inclusion of these aspects would have made the life sketch more complete.

Reproduction of his valuable and widely scattered publications in one volume has served a great purpse. Four of his papers have not, however, been reproduced and one expected a statement about the reason for their omission by the editor.

In Part II of the commemoration volumes, the organizers have to be highly congratulated for the the collection of a large number of articles of high standard from leaders of scientific thoughts from all over the world. It is particularly befitting the occasion that contributions in widely divergent fields of his activity could be collected.

As a matter of minor criticism it may be mentioned that two of the articles do not properly fit in here as they are really subjects for short notes in scientific journal. The authors of these two publication are likely to suffer the disadvantage that these may not be abstracted in abstracting journals.

We are confident that these two volumes will be hailed by the scientists and all the admirers of Professor Satyen Bose all over the world.

K. B.

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International Conference on Spectroscopy, Bombay 1967.

Dept. of Atomic Energy, Govt. of India, Bombay.
Price Rs. 75·00, $ 12·50

The book is a collection of invited talks presented at the symposium by some well-known spectroscopists. Most of the authors have reviewed the current developments in their special fields, while others have preferred to confine themselves to the discussion of their own work The papers are classified into the following categories: a) Electronic spectrum, 1) Atoms and diatomic molecules 2) Polyatomic molecules; b) Infra-red and Raman vibration-rotation spectra c) NMR and Microwave spectra d) Miscellaneous (including solid state) The book is stimulating and succeeds in giving a fairly good idea of the recent activities in spectroscopy. However, topics like laser spectroscopy, luminescence and energy transfer, Zeeman splitting of molecular levels, crystal field transitions etc. have not received much attention. It would have been better to include the relevant 'discussions' along with paper. The printing is very good. The book will be a good addition to the library of any research organisation.

M. C.

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Erwin Schrödinger. An Introduction to his Writings.

by William T. Scott, University of Massachusetts Press 1967,
V & Bibliography Pp 175 Price $6.50.

Erwin Schrödinger's contributions to Physics have been so great and their impact on philosophy so profound that his name is to-day familiar to anyone with a good general education. Yet as one goes through this book, one learns that Schrödinger was not merely a physicist, who besides making original researches, was troubled by the interpretations of his own work and not only did he ponder deeply of the basic problems of biology but his mind soared to such thoughts as 'Whence came I and whither go I?' and his analysis let him to the philosophy of 'Advaita' as propounded in the Vedanta. "We are all in reality sides or aspects of one single being, which may be called God while in the Upanishads its name is Brahman." The rather unusual book by Scott which proposes to give the reader an insight into the thoughts of this rich mind will naturally be welcome to the enlightened amongest the Physicists, but the reviewer feels afraid that there are not many who will be able to follow Schrödinger in this long and varied journey from physics to biology and then to philosophy and poetry.

A. K. R.

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Particles and Fields

by David Lurie, New York, John Wiley, 1968 pp xii + 506. Price $ 15.00

The interest in the quantum field theory is revived in recent years. Considerable attention is now being given to an examination of basic field theory by analyzing afresh some of the older problems. Field variables like currents and fields are being assigned important place as fundamental dynamical variables. At this juncture the appearance of this elegant representation of the orthodox quantum field theory by Dr. David Lurie is welcomed ; and this is a new addition to a few books already available on this subject by well-known authors.

The first half of the book, consisting of six chapters, contains a graceful simple treatment of the elements of field quantization and the covariant perturbation theory—the traditional domain in the field. The opening chapter deals with relativistic one-particle theories of Klein-Gordon field, Dirac field, massive vector field of spin 1 and Rarita-Schwinger field of spin 3/2 as well as the Maxwell field Chapter 2 is devoted to emphasise the field aspect of these theories and for the formulation of Lagrangian formalism. The connection between field and quantum particle aspects are then discussed by means of field quantization in Chapters 3 and 4. The canonical quantization of spin 0 and spin 1/2 fields, and on introductory discussion of Schwinger's quantum action principle are included in Chapter 3 ; whereas Chapter 4 is devoted to the quantization of electromagnetic field and massive fields of spin 1 and spin 3/2. The explicit discussion of spin 1 and spin 3/2 massive fields is an innovation in this book, which is seldom discussed in others. The present reviewer prefers the quantization of massive vector field retaining the β-formalism of Kemmer, which would have been just on the same line as Dirac field, instead of the method followed by the author.

Chapter 5 treats interacting quantum fields. The electromagnetic and non-electromagnetic couplings for elementary particle interactions have been formulated giving sufficient weight to the symmetry principles and conservation laws. Chapter 6 introduces the reader to the perturbation theory The first half of this chapter is concerned with Feynman rules for calculating the transition matrix elements with simple applications to electromagnetic and weak processes and the second half is devoted to renormalization theory. The treatment of the renormalization theory, reduction formulae and spectral representation brings out the essential ideas without being too much entangled in mathematical details. Coupling constants and sum rules have been discussed in a quite fascinating manner.

The second half of the book, which constitutes the last four chapters, is devoted to introducing the reader to advanced quantum field theory. S-matrix and the link between transition amplitudes and the vacuum expectation values of products of field operators are developed in Chapter 7. Particular stress is made on the abstract nonperturbative reformulation of field theory based on the used of the asymptotic condition. Chapter 8 deals with a few applications of field theoretic techniques to particle physics -topics include the Goldberger-Treiman relation, the Adler-Weisberger sum rule and the universality of the vector coupling constant in the theory of weak interactions. Chapter 9 is devoted to a number of topics relating to bound states, which include the Bethe-Salpeter equation and the assignment of field operators to composit particles. The final chapter is concerned with the powerful functional approach to quantum field theory developed by Schwinger. Application of this functional technique is made to the Gold-

stone theory and to one-dimensional quantum electrodynamics. A short discussion on the functional integration technique is also included. The treatment of the Bethe-Salpeter equation, of bound state and of the functional method, which are generally discussed only briefly in the most of the existing books on the field theory, is praiseworthy.

The dispersion relations and the axiomatic field theory—two major topics have been completely omitted in the book. On the inclusion of these topics the book would h ve been more or less complete. The author could not treat every aspect of many problems in the same detail, and one may differ from him in the appreciation of relative importance of such aspects. The book is mainly intended for theoretical physicists, Those with some experience in this field will find it extremely valuable both for consecutive reading and for reference purpose. A new comer would enjoy this book if he is well-acquainted with the ordinary non-relativistic quantum mechanics, including the formal theory of scattering, relativistic quantum mechanics, and with the basic phenomenology of elementary particles. He would derive a great deal of benefit by reading this book and supplementing it with other readings.

In summary, this book should prove very helpful to those who want to specialize in quantum field theory,

S. G.